

PsyVBot: Chatbot for Accurate Depression Diagnosis using Long Short-Term Memory and NLP

Authors : Thaveesha Dheerasekera, Dileeka Sandamali Alwis

Abstract : The escalating prevalence of mental health issues, such as depression and suicidal ideation, is a matter of significant global concern. It is plausible that a variety of factors, such as life events, social isolation, and preexisting physiological or psychological health conditions, could instigate or exacerbate these conditions. Traditional approaches to diagnosing depression entail a considerable amount of time and necessitate the involvement of adept practitioners. This underscores the necessity for automated systems capable of promptly detecting and diagnosing symptoms of depression. The PsyVBot system employs sophisticated natural language processing and machine learning methodologies, including the use of the NLTK toolkit for dataset preprocessing and the utilization of a Long Short-Term Memory (LSTM) model. The PsyVBot exhibits a remarkable ability to diagnose depression with a 94% accuracy rate through the analysis of user input. Consequently, this resource proves to be efficacious for individuals, particularly those enrolled in academic institutions, who may encounter challenges pertaining to their psychological well-being. The PsyVBot employs a Long Short-Term Memory (LSTM) model that comprises a total of three layers, namely an embedding layer, an LSTM layer, and a dense layer. The stratification of these layers facilitates a precise examination of linguistic patterns that are associated with the condition of depression. The PsyVBot has the capability to accurately assess an individual's level of depression through the identification of linguistic and contextual cues. The task is achieved via a rigorous training regimen, which is executed by utilizing a dataset comprising information sourced from the subreddit r/SuicideWatch. The diverse data present in the dataset ensures precise and delicate identification of symptoms linked with depression, thereby guaranteeing accuracy. PsyVBot not only possesses diagnostic capabilities but also enhances the user experience through the utilization of audio outputs. This feature enables users to engage in more captivating and interactive interactions. The PsyVBot platform offers individuals the opportunity to conveniently diagnose mental health challenges through a confidential and user-friendly interface. Regarding the advancement of PsyVBot, maintaining user confidentiality and upholding ethical principles are of paramount significance. It is imperative to note that diligent efforts are undertaken to adhere to ethical standards, thereby safeguarding the confidentiality of user information and ensuring its security. Moreover, the chatbot fosters a conducive atmosphere that is supportive and compassionate, thereby promoting psychological welfare. In brief, PsyVBot is an automated conversational agent that utilizes an LSTM model to assess the level of depression in accordance with the input provided by the user. The demonstrated accuracy rate of 94% serves as a promising indication of the potential efficacy of employing natural language processing and machine learning techniques in tackling challenges associated with mental health. The reliability of PsyVBot is further improved by the fact that it makes use of the Reddit dataset and incorporates Natural Language Toolkit (NLTK) for preprocessing. PsyVBot represents a pioneering and user-centric solution that furnishes an easily accessible and confidential medium for seeking assistance. The present platform is offered as a modality to tackle the pervasive issue of depression and the contemplation of suicide.

Keywords : chatbot, depression diagnosis, LSTM model, natural language process

Conference Title : ICDLML 2024 : International Conference on Deep Learning and Machine Learning

Conference Location : London, United Kingdom

Conference Dates : October 17-18, 2024